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Changes in the course of reaction and regeneration of a Pd-Ag/Al 2O3 catalyst for the selective hydrogenation of acetylene

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Abstract

The samples of Pd-Ag/Al2O3 catalysts for the selective hydrogenation of acetylene impurities in an ethane-ethylene mixture were studied using the IR spectroscopy of adsorbed CO, X-ray diffraction analysis, and thermogravimetry. In the course of reaction and regeneration, the total concentration of the supported metals (Pd and Ag) changed only slightly. The degree of accessibility of silver atoms to CO adsorption and the amount of these atoms in the nearest environment of palladium atoms decreased to result in an increase in the selectivity of acetylene hydrogenation to ethane. The decrease in the accessibility of silver was due to a change in the phase composition of the alumina support as a result of its rehydration. It was hypothesized that the resulting aluminum hydroxide with the boehmite morphology is a source of the strongest Lewis acid sites, which catalyze oligomerization processes on the catalyst surface. © 2007 MAIK "Nauka/ Interperiodica".

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